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Method and apparatus for combining properties in mobile station

The invention relates to the combining of properties of a mobile station. The invention also relates to controlling and managing these combined properties in a desired manner.

- 5 At present the two most common methods of communication between mobile station users are either a direct telephone call or sending a message. Messages conventionally contain text or graphic data. Through messages the users are able to communicate privately, without other persons hearing the conversation. Such communication techniques are currently still very limited.
- 10 When a mobile station receives a connection setup request, the user perceives it as he hears the ringing, sees lights coming up or sees a text on the display. With these properties the user can control the contents of the display and the sound without turning the apparatus off. The text and/or graphic image output on the display depend on whether the name and number information of the requesting apparatus
- 15 are stored in the memory of the mobile station and, further, whether this name-number information belongs to a specific caller group. If the name-number information is stored in the memory of the mobile station, the text and/or image on the display indicates the identity of the calling mobile station. If the name-number information belongs to a caller group, the display also shows the caller group identifier.
- 20 Otherwise the display just indicates that an apparatus is requesting a telephone connection.

- Let us next consider existing properties of mobile stations, such as sound, vibration, graphic data and illuminating properties. The sound world of mobile stations is rapidly expanding and one does not have to grow tired of a single sound but,
- 25 instead, the ringing sound of the telephone apparatus can be changed, for example according to the fashion or season. There are countless number of ringing sounds to be ordered, and the user may even compose the ringing sound himself. A ringing sound may be associated with a certain caller or caller group. In addition to or instead of a sound alert, vibration may be used to indicate an incoming call. The
- 30 vibration property is intended to provide additional attention in situations where sound alone is insufficient.

Images, which are graphic presentations shown on the display element of a telephone apparatus, may be associated with text messages and caller groups. Graphic objects may be produced by the user himself or they may be ordered from service

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providers. A graphic image on the display of a user's mobile station serves as a logo or identifier, and it may be e.g. the name and/or logo of the user's firm or an identifier associated with the user's hobbies or interests. Text messages may comprise both text and graphic images. When the apparatus rings and the call request is coming from an apparatus belonging to a certain caller group, the display shows the graphic associated with the caller group.

To illuminate the display and keys, mobile stations use several light units which often are light emitting diode (LED) components. The light units are located on the printed circuit board of the mobile station, where they often are placed on the sides of the display and keypad or between the keys. They are placed in such a manner that the light produced by them is distributed via photoconductors, which are part of the assembly, onto the desired area. Thus the whole front surface of the mobile station, generally the display in the upper part and keypad in the lower part, can be illuminated. Illumination makes it possible to use the apparatus even in poorly lit conditions. Usually, as the apparatus rings or as the user activates the apparatus, the light units in the apparatus light up.

A versatile operating environment is further emphasized when mobile stations become more and more popular. Youthfulness, originality and trendiness are important product characteristics in the ever more competitive mobile station market. The dynamicity of a product has more significance in the market than even the performance of the product.

The object of the invention is to provide a mobile station with a more fashionable and youthful general appearance by enhancing the chances of the user to personalize his mobile station and by making the methods of communication between mobile stations more versatile.

The object is achieved by expanding the existing mobile station properties to be used in other operating areas of mobile stations than the current known operating areas.

The invention is characterized by what is specified in the characterizing parts of the independent claims.

Two or more mobile station users can communicate not only via a conventional telephone connection but also by sending messages to each other, for example. According to the invention the communications connections may contain, in addition to speech or text, various effects stimulating the visual, auditory or tactile sense

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or a combination thereof. The added special effects may be e.g. sound, vibration, graphic presentation or illumination by the light components of the apparatus. It is obvious that these properties of a telephone apparatus may also be used to personalize the properties of a user's personal mobile station. Inter-mobile station communication according to the invention verges on multimedia solutions.

The ringing sounds of mobile stations vary from the traditional peeping to composed melodies. Despite the monotony, the sound world is versatile, melodies are easy to recognize and the simple note patterns are memorable and catchy. The primary function of the ringing sounds in mobile stations is to call attention, they are seldom used for anything else. Sound is a basic property of the mobile station, and its field of application can be easily expanded. For instance, in accordance with the invention, laughter tone/sound could be attached to a joke sent as a text message.

Together with or instead of sounds, vibration may be used. In that case the apparatus must comprise a vibration unit which can generate the vibrating motion. The vibration rate and rhythm can be controlled or it may be associated with the rhythm of the sound, for instance. A vibration unit is a good supplement to the sound world, but it can also be used totally independent of sounds. Vibration may be synchronized with the flashing of leds, for example, or it may have a rhythm of its own, which is independent of the other properties. According to the invention, vibration may be combined with a text message or it may be transmitted to the receiving apparatus during a call.

The lighting of the user interface may also be controlled in a mobile station. For example, the display and keypad of the apparatus may flash in a given rhythm. This property, too, adds to the noticeability. The flashing rhythm and pace of the light units are variable and their control may be based on the ringing sound used or the user may determine the pace himself. Different colors may also be used in the light units. The light units are lit up individually, in groups and/or in different colors. By changing the color one can match the illumination of the apparatus with the other properties thereof, such as e.g. the color of the cover. Illumination control may also be added to a text message to be sent to the receiving apparatus, or an illumination control command may be transmitted to the receiving apparatus during a call.

In addition to sounds, vibration and lighting, a mobile station can adduce graphics. Brief animations can be presented on the display, associated with various combinations of all the properties mentioned above. Images are already featured in text

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messages, but now they can be associated with e.g. sound, or the lights of the display can be lit in various colors when a graphic is displayed.

The user may program these functions in his own apparatus or send them to the receiving apparatus. The properties thereby serve both as a means of personalizing the user's telephone apparatus and as a supplement or alternative to conventional methods of communication. Communication by mobile stations verges on multimedia applications in that it is possible to combine effects perceptible with different senses. On the other hand, communication properties are emphasized in mobile stations since a real-time connection is maintained at the same time. The invention is advantageously and easily applicable to mobile communication devices. Moreover, the alternative means of attracting attention facilitate the use of a mobile station among users with sensory defects.

The invention is below described more closely, referring to the preferred embodiments presented by way of example and to the accompanying drawings in which

Fig. 1 shows a mobile station according to a preferred embodiment, and

Fig. 2 shows by way of example alternative ways of transmitting a message between mobile stations according to a preferred embodiment.

Let us consider the mobile station shown in Fig. 1, which comprises the essential components according to a preferred embodiment. The mobile station includes a control unit 101 which is responsible for the operation of the whole mobile station. The control unit 101 comprises a microprocessor by means of which functions are controlled and monitored. The mobile station further includes a memory 160, keyboard 150 and a data interface 170 dependent on the particular device and application.

Messages to be sent from the mobile station are composed in the control unit 101 from which they are directed to a transmitter part TX 143 and thence via a duplexer 141, which may be a filter or switch, to an antenna 140 to be transmitted further. Sounds received by a microphone 147 can be directed via a speech encoder 146 to the control unit 101. Messages received by the antenna 140 are directed via the duplexer 141 to a receiver part 142 from which place the message is taken further depending on its type. Received messages may be directed either via the control unit 101 to a message-processing unit or direct to a speech decoder 144 and thence to a loudspeaker 145.

A sounds control unit 130 takes care of the processing of sounds which are not generated in the speech decoder 144. The sounds control unit 130 may fetch or store sounds or different note patterns from a discrete memory unit 132 containing sounds. The sounds control unit 130 sends the sounds to be reproduced either in the sounds unit 131 or loudspeaker 145. The control unit 101 and sounds memory 132 are interconnected, so it is possible to store data in or fetch data from the sounds memory 132 via the control unit 101. Storing data from the control unit 101 into the sounds memory 132 means that a new sound is saved for later use. The control unit may read data from the sounds memory e.g. when a sound is to be transmitted as part of a message to another user's mobile station.

The vibration control unit 120 may receive data from the control unit 101 or from the vibration effects memory 122. The received data is sent by the vibration control unit 120 to be executed in the vibration unit 121. Also the vibration effects memory 122 is bi-directionally connected with the control unit 101. Thus it is possible to store vibration data via the control unit 101 into the vibration effects memory 122 and fetch vibration data from the memory for processing.

Illumination control unit 102 gets flash patterns from the flash patterns memory 106 or from the mobile station's control unit 101 if the flash pattern is received from another apparatus. The illumination control unit 102 forwards the flash patterns to the light units 103, 104, 105 which illuminate the user interface of the mobile station; here can be seen three light units by way of example. Some of these light units may be background lights for the display. The flash patterns memory 106 is interconnected with the mobile station's control unit 101 which may fetch flash patterns from the memory for processing or store them into the memory 106 for future use.

Data is input to the display control unit 110 from the mobile station control unit 101 or graphic objects memory 112. The display controller 110 directs the data further to the display 111 where it is presented to the user. The control unit 101 also has a direct connection with the graphic objects memory 112, which means the control unit can process the graphic objects in memory e.g. by modifying, deleting or adding them. Furthermore, by means of the control unit 101 it is possible to combine objects and add properties to them, such as displaying multiple images in a row, whereby the output displayed to the user is a brief animation.

So, the mobile station control unit 101 may compile data from the sounds memory 132, vibration effects memory 122, flash patterns memory 106 and graphic objects

memory 112, and build associations between various data according to their properties or according to instructions from the user. The control unit 101 may send the compiled entity to its controllers for execution or to the transmitter unit 142 from where the data packet is further transmitted via the duplexer 141 and antenna 140 to
 5 another mobile station, for instance.

Let us next consider more closely these functions which can be used to supplement the conventional personalization and communication properties of a mobile communication device.

The ringing sound chosen by the user tells something about him to other people.
 10 Moreover, the owner of the apparatus will recognize the sound emanating from his apparatus, and maybe the ringing sound even indicates a certain caller so that the user knows how to react to the call. The sound data selected may be activated in the user's own apparatus also at other times than in connection with ringing, and the sound data may also be transmitted to the receiving apparatus. The sound data
 15 selected may be activated in conjunction with a certain function of the phone. For instance, when a calendar reminds of a birthday, the sound controller can fetch a birthday song from the memory and send it to the loudspeaker. Moreover, sound data can be instructed to be executed at a certain hour of the day, e.g. so that at six o'clock in the morning the apparatus plays the melody "Are you sleeping, are you
 20 sleeping, Brother John". In addition, the reproduction of sound may be activated as a consequence of a certain action by the user.

Sound data may be transmitted to the receiving apparatus e.g. as a ringing command when a connection has been set up. Thus the calling mobile station can determine the ringing sound. Sound data may also be transmitted in such a manner that it is
 25 activated as soon as it is received or after a certain period of time or as a result of some action. For example, an effect in the middle of a text message may be activated when the text message is read, whereby the effects according to the instructions are executed and normal reading of the message can continue. A text message may e.g. comprise a quotation from a song as part of the normal text. Preceding the
 30 quotation there may now be an effect start command to activate the sounds controller so that when the reader of the message reads the quotation, he at the same time activates the corresponding music to be played in his apparatus. At the end of the quotation or message there is a corresponding effect end command which terminates the execution in the sounds controller, or the effect is terminated when the
 35 message has been read, for instance.

If the effect entity was sent to the receiving mobile station as part of a text message, the effect entity is associated with the message and is automatically stored with the message. The effect entity may also be stored separately from the message. Indeed the effect entity may be sent independently, unassociated with any other message.

- 5 The effect entity includes an activation instruction specifying the time of or triggering action for presenting the effect entity. In addition the effect entity may include information about whether the message is displayed in the receiving apparatus just once, for a certain period of time, or whether the presentation can be activated as many times as the user of the receiving apparatus wants.